

CLAIMS:

1. A method for operating an internal combustion engine with electromechanical valves, the method comprising:

5 operating at least a cylinder in a multi-stroke mode; and

adjusting the number of valves that operate in a cycle of said cylinder based at least on an operating condition of at least an electromechanical valve.

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2. The method of Claim 1 wherein said operating condition is a temperature of a valve actuator coupled to at least one of said electromechanically actuated valves.

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3. The method of Claim 2 wherein said valve actuator is comprised of at least an armature, a coil, and a core.

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4. The method of Claim 1 wherein said operating condition of said electromechanically actuated valve is an impedance of a valve actuator coupled to at least one of said electromechanical actuated valves.

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5. The method of Claim 1 wherein said operating condition of said electromechanically actuated valve is a temperature of at least one of said electromechanically actuated valves.

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6. The method of Claim 1 wherein said operating condition of said electromechanically actuated valve is an amount of power consumed by a valve actuator coupled to at least one of said electromechanically valves.

7. A method for operating an internal combustion engine with valves that may be deactivated, the method comprising:

operating at least a cylinder in a multi-stroke
5 mode; and

varying the number of valves that operate in a cycle of said cylinder as an operating condition of said engine varies.

10 8. The method of Claim 7 wherein said operating condition is an engine temperature.

9. The method of Claim 7 wherein said operating condition is at least one of an engine speed and an
15 engine load.

10. The method of Claim 7 wherein said operating condition is a cylinder valve temperature.

20 11. A method for determining a number of electro-magnetically actuated valves to operate in an internal combustion engine operating in a multi-stroke cylinder mode, the method comprising:

determining an operating condition of an
25 electro-magnetically actuated valve;

operating at least one cylinder of said engine in a multi-stroke mode; and

30 determining a number of electro-magnetically actuated valves to operate, based on said operating condition, in said at least one cylinder operating in said multi-stroke mode.

12. The method of Claim 11 wherein said operating condition is a temperature of a valve actuator coupled to at least one of said electromechanically actuated valves.

5 13. The method of Claim 12 wherein said valve actuator is comprised of at least an armature, a coil, and a core.

10 14. The method of Claim 11 wherein said operating condition of said electromechanically actuated valve is an impedance of a valve actuator coupled to at least one of said electromechanical actuated valves.

15 15. The method of Claim 11 wherein said operating condition of said electromechanically actuated valve is a temperature of at least one of said electromechanically actuated valves.

20 16. A method for determining a number of electro-magnetically actuated valves to operate in an internal combustion engine operating in a multi-stroke cylinder mode, the method comprising:

 determining an operating condition of said engine;

25 operating at least one cylinder of said engine in a multi-stroke mode; and

 determining a number of electro-magnetically actuated valves to operate, based on said operating condition, in said at least one cylinder operating in said multi-stroke mode.

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17. The method of Claim 16 wherein said operating condition is an engine temperature.

18. The method of Claim 16 wherein said operating condition is engine speed.

19. The method of Claim 16 wherein said operating condition is engine load.

20. A method for determining a number of valves to operate in an internal combustion engine operating in a multi-stroke cylinder mode, the method comprising:

10 determining an operating condition of at least an electromechanical valve;

operating at least two groups of cylinders, a first group operating in a first cylinder stroke mode, and a second group operating in a second cylinder stroke mode; and

determining a number of valves to operate, based on said operating condition, in said first cylinder group and in said second cylinder group.

20 21. The method of Claim 20 wherein said operating condition is a temperature of a valve actuator coupled to at least one of said electromechanically actuated valves.

22. The method of Claim 21 wherein said valve actuator is comprised of at least an armature, a coil, and a core.

23. The method of Claim 20 wherein said operating condition of said electromechanically actuated valve is an impedance of a valve actuator coupled to at least one of said electromechanical actuated valves.

24. The method of Claim 20 wherein said operating condition of said electromechanically actuated valve is a temperature of at least one of said electromechanically actuated valves.

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25. The method of Claim 20 wherein said operating condition of said electromechanically actuated valve is an amount of power consumed by a valve actuator coupled to at least one of said electromechanically valves.

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26. A method for determining a number of valves to operate in an internal combustion engine operating in a multi-stroke cylinder mode, the method comprising:

15 determining an operating condition of an engine;

 operating at least two groups of cylinders, a first group operating in a first cylinder stroke mode, and a second group operating in a second cylinder stroke mode; and

20 determining a number of valves to operate, based on said operating condition, in said first cylinder group and in said second cylinder group.

25 27. The method of Claim 26 wherein said operating condition is an engine temperature.

28. The method of Claim 26 wherein said operating condition is engine speed.

30 29. The method of Claim 26 wherein said operating condition is engine load.

30. A method for operating an internal combustion engine with electromechanical valves, the method comprising:

operating at least a cylinder of said internal combustion engine; and

5 adjusting the number of operating said electromechanical valves and the number of strokes in a cycle of said cylinder based at least on an operating condition of said engine.

10 31. The method of Claim 30 wherein said operating condition is an engine temperature.

32. The method of Claim 30 wherein said operating condition is engine speed.

15 33. The method of Claim 30 wherein said operating condition is engine load.

34. The method of Claim 30 wherein said number of
20 operating electromechanical valves and said number of cylinder strokes is further based on an operating condition of at least a electromechanically actuated valve.

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35. A method for determining at least a multi-stroke cylinder mode and the number of electro-magnetically actuated valves to operate in an internal combustion engine, the method comprising:

5 determining an operating condition of said internal combustion engine;

determining at least a multi-stroke cylinder mode based on said engine operating condition; and

10 determining a number of electro-magnetically actuated valves to operate based on said engine operating condition.

36. The method of Claim 35 wherein said operating condition is an engine temperature.

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37. The method of Claim 35 wherein said operating condition is engine speed.

38. The method of Claim 35 wherein said operating condition is engine load.

39. A computer readable storage medium having stored data representing instructions executable by a computer to control an internal combustion engine of a vehicle, said storage medium comprising:

instructions for operating at least a cylinder in a multi-stroke mode; and

30 instructions for adjusting the number of operating valves in said cylinder based at least on an operating condition of at least an electromechanical valve.